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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/810,720	Group:	2621
Filing Date:	March 29, 2004	Examiner:	Robert Chevalier
Applicant:	Byung-Jin KIM		
Title:	METHOD OF REPRODUCING A STILL PICTURE FROM A RECORDING MEDIUM, METHOD OF DECODING THE STILL PICTURE AND THE RECORDING MEDIUM		
Attorney Docket:	1740-000011/US/COA		

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STATEMENT OF ACCURATE TRANSLATION

Sir:

Concerning the attached document written in the English language, I (Yong-Cheon KIM) hereby declare as follows.

I am knowledgeable in the Korean language and in the English language. I have reviewed Korean Patent Application No. 99-47843 and believe the attached document to be an accurate translation thereof.

All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true. Further, these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: Oct. 11, 2006

Signature: Yong Cheon Kim

Yong-Cheon KIM

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ABSTRACT

Summary

The present invention relates to a method of realizing still pictures from a high-density disc-type recording medium. The method includes a first step of detecting whether picture data read from the high-density disc-type recording medium is data corresponding to a still picture; and a second step of, after transmission of the detected picture data, repeatedly transmitting a predicted picture thereof for a predetermined time period. Thus, the method records and manages the still information that enables the management and identification of a data stream, corresponding to a still picture, among data streams recorded on an HDVD, thus being capable of outputting the background screen of a menu screen for selecting various functions, which are provided by the HDVD, or an option menu screen for allowing the user to arbitrarily edit the details of a moving picture program, in a still picture form in a D-TV or HD digital TV connected via a digital interface, such as an IEEE 1394 interface.

Key Figure

FIG. 5

Key Words

High-density DVD, digital television, still, still picture, intra picture data

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SPECIFICATION

Title

METHOD OF REALIZING STILL PICTURES FROM HIGH-DENSITY DISC-TYPE RECORDING MEDIUM

Brief Description Of The Drawings

FIG. 1 shows a connection state between a HDVDP and a D-TV;

FIG. 2 shows a data stream based on a method of realizing still pictures from a high-density disc-type recording medium according to a first embodiment of the present invention;

FIG. 3 shows a data stream based on a method of realizing still pictures from a high-density disc-type recording medium according to a second embodiment of the present invention;

FIG. 4 shows management information based on a method of realizing still pictures from a high-density disc-type recording medium according to a third embodiment of the present invention; and

FIG. 5 shows a data stream based on the method of realizing still pictures from a high-density disc-type recording medium according to the third embodiment of the present invention.

Major Elements In Drawings

100: HDVDP

200: HD digital TV

Background Of The Invention

The present invention relates to a method of

realizing still pictures from a high-density disc-type recording medium, which can output data streams, which are read and transmitted from a disc-type recording medium, such as a High-density Digital Versatile Disc (HDVD), as still pictures in a Digital TeleVision (D-TV) or High-Definition (HD) television.

HDVDs are high-density and multifunctional moving picture recording media for which standardization work is currently rapidly being conducted between related businesses, and are expected to be widely popularized along with typical DVDs. An HDVD Player (HDVDP) for playing such an HDVD is definitely expected to be connected to and used in conjunction with a D-TV or to an HD digital TV, which is capable of displaying high-quality images, via a digital interface, such as an IEEE 1394 interface. Various schemes for outputting a background picture of a menu screen, which allows a user to select various functions provided by the HDVD, or a still picture of an option menu screen, which allows the user to arbitrarily edit the details of a moving picture program, in a still picture form in the D-TV or HD digital TV are being discussed between related businesses.

For this purpose, in a currently developed DVD-ROM, still marks are additionally recorded in respective locations at which data streams, in particular, video streams that correspond to still pictures, are recorded on a disc. Meanwhile, in a DVD-ROM player for playing the DVD-ROM, when a still mark is detected during the reading and reproduction of data streams recorded on the DVD-ROM, a still operation of outputting immediately previously decoded video stream as a still picture is automatically performed.

That is, the DVD-ROM player is provided with a separate Moving Picture Experts Group (MPEG) decoder

therein to be connection to and used in conjunction with a general analog TV in which no MPEG decoder is provided, so that it can decode the data streams read from the DVD-ROM, and thus still marks included in the data streams, in particular, video streams, can be detected.

However, since the HDVDP, as described above, is being developed to be connected to and used in conjunction with a digital TV or HD digital TV, in which an MPEG decoder is provided, via a digital interface, such as an IEEE 1394 interface, no separate MPEG decoder is provided therein, unlike the DVD-ROM player.

Accordingly, in the case where still marks, which are additionally recorded in separate recording locations in video streams that correspond to still pictures, are additionally recorded on the HDVD, as in the DVD-ROM, there is a problem in that the additionally recorded still marks cannot be detected because the HDVDP is not provided with an MPEG decoder for decoding and detecting the still marks.

Furthermore, in the currently developed digital TV or HD digital TV, a means for realizing the output of still pictures required when being connected to and used in conjunction with the HDVDP has not yet been provided, as described above, therefore, a scheme for solving the problem is urgently required.

Explanation Of The Invention

It is an object of the present invention to provide a method of realizing still pictures from a high-density disc-type recording medium, which records and manages still information that enables the management and identification of data streams, corresponding to still pictures, among data streams recorded on an HDVD, thus being capable of outputting data streams, which are transmitted via a

digital interface, such as an IEEE 1394 interface, as still pictures in a D-TV or HD digital TV.

In order to achieve the above object, the present invention provides a method of realizing still pictures from a high-density disc-type recording medium, includes a first step of recording still information for identifying picture data, recorded in a specific location, as a still picture, along with the picture data; and a second step of recording and managing information indicating whether a still picture exist in pieces of reproduction sequence information that correspond to HD stream Objects (HOBs) that include the picture data and are formed through logical division. The first step is the step of storing the still information, along with intra-coded still picture data, in a packet form, and the second step is the step of additionally recording and managing information indicating a location of the still picture data in the reproduction sequence information.

In addition, the present invention provides a method of realizing still pictures from a high-density disc-type recording medium, including a first step of detecting whether picture data read from the high-density disc-type recording medium is data corresponding to a still picture; and a second step of, after transmission of the detected picture data, repeatedly transmitting a predicted picture thereof for a predetermined time period.

The preferred embodiments of a method of realizing still pictures from a high-density disc-type recording medium according to the present invention are described in detail with reference to the accompanying drawings below.

FIG. 1 shows a D-TV or HD digital TV 200 that is connected with an HDVDP 100, to which a method of realizing still pictures from a high-density disc-type recording

medium according to a first embodiment of the present invention, via a digital interface, such as an IEEE 1394 interface, is applied. A data stream recorded on the HDVD is logically divided into HD stream Objects (HOBs) that are continuous over time, like a single program. The HOBs correspond one-to-one to pieces of reproduction sequence information for respective cells, which are used to determine a reproduction sequence so that a user can arbitrarily select the details of moving pictures to be reproduced in the D-TV or HD digital TV 200, and are then managed. As shown in FIG. 2, still information designating the repeated reproduction of an immediately previously read and transmitted data stream, in particular, picture data previously decoded in the D-TV or HD digital TV 200, and the output of a still picture, for example, a sequence end code S_E designating the termination of a sequence reproduction operation and the repeated reproduction of previous picture data, is included and recorded in each of the HOBs.

Meanwhile, information indicating that still information has been included and recorded in the data stream of a corresponding HOB, for example, Still Duration S_D indicating still start and end time, is recorded and managed in each piece of reproduction sequence information.

Accordingly, the sequence end code S_E is included in the data stream of the HDVD, which is transmitted to the D-TV or HD digital TV 200 through the isochronous channel of the digital interface, such as the IEEE 1394 interface, and is transmitted. When detecting the sequence end code S_E while decoding the transmitted data stream, the D-TV or HD digital TV 200 repeatedly outputs previously decoded picture data, thus outputting a still picture.

Thereafter, the HDVDP 100 transmits a command for

canceling still pictures, that is, a command for interrupting a repeated reproduction operation, to the D-TV or HD digital TV 200 through the asynchronous channel of the digital interface, such as the IEEE 1394 interface, based on the still duration S_D included in each piece of reproduction sequence information for each cell. The D-TV or HD digital TV 200, which is currently outputting a still picture through the repeated reproduction operation, interrupts the repeated reproduction operation in response to the command and then performs a general reproduction operation of sequentially reproducing a received data stream, thus outputting a still picture for a predetermined time period.

For reference, the still duration S_D, which is included and managed in each piece of reproduction sequence information for each cell, may be classified as finite still duration information, which is set to about 1 to 254 seconds, and infinite still information, which is set to infinite (∞) time until a subsequent key input occurs, and may thus be managed.

Meanwhile, FIG. 3 shows a data stream based on a method of realizing still pictures from a high-density disc-type recording medium according to a second embodiment of the present invention. As described with reference to FIG. 1, in the state in which the D-TV or HD digital TV 200 is connected with the HDVDP 100 via the digital interface, such as an the IEEE 1394 interface, the data stream recorded on the HDVD is logically divided into the HOBs that are continuous over time, like a single program. The HOBs correspond one-to-one to the pieces of reproduction sequence information for respective cells, which are used to determine the reproduction sequence so that the user can arbitrarily select the details of moving pictures to be

reproduced in the D-TV or HD digital TV 200, and are then managed. As shown in FIG. 3, a still packet SP, in which still information indicating the repeated reproduction of picture data, which will be decoded later, in the D-TV or HD digital TV 200 and the output of a still picture, for example, the still duration S_D designating the termination of the sequence reproduction operation and the repeated reproduction of picture data to be output after the termination of the sequence reproduction operation is included and recorded, is included and recorded in a data stream within the HOB.

Accordingly, the still packet SP, in which the still duration S_D is included, is included in the data stream of the HDVD, which is transmitted to the D-TV or HD digital TV 200 through the isochronous channel of the digital interface, such as the IEEE 1394 interface, and is transmitted, so that the D-TV or HD digital TV 200 detects the still duration S_D, which is read from the still packet SP, by decoding the transmitted data stream, and repeatedly outputs picture data to be decoded later, thus outputting a still picture.

Thereafter, the D-TV or HD digital TV 200, which is currently outputting a still picture through the repeated reproduction operation, interrupts the repeated reproduction operation in conformity with a repetition reproduction time period designated by the still duration S_D and then performs a general reproduction operation of sequentially reproducing a continuous data stream, thus outputting a still picture for a predetermined time period.

For reference, in this case, it is not necessary to transmit a separate command to interrupt the repeated reproduction operation, unlike the first embodiment described above. Furthermore, the still duration S_D may

be classified as finite still duration information, which is set to about 1 to 254 seconds, and still information, which is set to infinite (∞) time, and may be managed and transmitted.

Meanwhile, FIG. 4 shows management information based on a method of realizing still pictures from a high-density disc-type recording medium according to a third embodiment of the present invention. As described above, in the state in which the D-TV or HD digital TV 200 is connected with the HDVDP 100 via the digital interface, such as the IEEE 1394 interface, the data stream recorded on the HDVD is logically divided into the HOBs that are continuous over time, like a single program. The HOBs correspond one-to-one to the pieces of reproduction sequence information for respective cells, which are used to determine the reproduction sequence so that the user can arbitrarily select the details of moving pictures to be reproduced in the D-TV or HD digital TV 200, and are then managed. As shown in FIG. 4 (a), each of HD steam OBject Units (HOBUs) constituting a single HOB is divided into respective packs, which are predetermined recording units. In this case, a single pack corresponds to a sector, which is the physical recording unit of an accessible disc-type recording medium. Each of the packs includes a single piece of pack header information 'HD_PCK Header' and a plurality of transport packets 'TS_PKT 1, 2 · · ·.'

Furthermore, Program Clock Reference (PCR) information, in particular, transmission time reference information 'SYS_PCR_base' and 'SYS_PCR_ext', in which both of the small unit time point 'SYS_PCR_ext,' which is obtained by counting 9 bits at 27 ㎒ based on the MPEG standard, and the large unit time point 'SYS_PCR_base,'

which is obtained by counting 33 bits at 90 ㎑, are recorded, a 'Reserved' field, and a still indicator designating the repeated transmission of a read data stream may be included and recorded in the pack header information. The still indicator is a 1-bit flag. For example, when the value thereof is set to '1', a direction is made to repeatedly transmit intra-picture data 'I-Picture Data' and predicted picture data 'P-Picture Data', which will be read later.

Meanwhile, of the pieces of the reproduction sequence information for respective cells, reproduction sequence information for cell K, corresponding to a still picture, as shown in FIG. 4 (b), includes general reproduction sequence information 'Cell General Information' in which general information about the reproduction sequence of still pictures is recorded, and a plurality of pieces of still picture location information 'Still Picture Entry Point Information' in which information about the locations of HOBUs, in which still picture data is recorded, is recorded. 1-byte still picture presence information 'Still_YES', indicating whether a still picture exists and the number of still pictures, is included and recorded in the general reproduction sequence information.

Accordingly, the HDVDP 100 finds a recording location in which still picture data is included and recorded, that is, a corresponding HOBU, by searching the still picture presence information and the still picture location information, which are recorded and managed in the reproduction sequence information for cell K, and, at the same time, checks the value of the still indicator that has been recorded in the pack header information of the data stream to be read later. In this case, when the value of the still indicator is set to '1', an intra picture data

stream, including sequence header information 'Sequence Header,' GOP header information 'GOP Header,' intra-picture header information 'I-Picture Header' and intra-picture data 'I-Picture Data' is transmitted and then a predicted data stream, including predicted picture header information 'P-Picture Header' and predicted picture data 'P-Picture Data,' is repeatedly transmitted. The intra picture data stream and the predicted picture data stream to be transmitted repeatedly are transmitted repeatedly at predetermined periods, for example, at transmission periods determined such that the intra picture data stream and the predicted picture data stream have a ratio of 1 : 15. For the intra picture data stream, PCR information corresponding to the transmission period is generated and added to the intra picture data steam, and the intra picture data stream added with the PCR information is repeatedly transmitted. For the predicted picture data stream, the predicted picture header information 'P-Picture Header' is repeatedly transmitted alone, without separate picture data.

Meanwhile, the still duration S_D used to repeatedly transmit the intra picture data stream and the predicted picture data stream may be recorded and managed in each piece of reproduction sequence information for each cell, which corresponds to a corresponding HOB, or may be included and recorded in the pack header information. A repeated transmission operation is interrupted in conformity with the still duration S_D.

Accordingly, the D-TV or HD digital TV 200, which receives the repeatedly transmitted data stream, outputs a still picture, as in the first and second embodiments described with reference to FIGS. 2 and 3, even though it does not perform a separate reproduction operation of

repeatedly reproducing a received data stream is not performed. Furthermore, it is not necessary to transmit a separate command for interrupting the repeated reproduction operation, and thus it is not necessary for the D-TV or HD digital TV to perform any function or operation of outputting a still picture.

Effect Of The Invention

The method of realizing still pictures from a high-density disc-type recording medium, as described above, records and manages the still information that enables the management and identification of a data stream, corresponding to a still picture, among data streams recorded on an HDVD, thus being capable of outputting the background screen of a menu screen for selecting various functions, which are provided by the HDVD, or an option menu screen for allowing the user to arbitrarily edit the details of a moving picture program, in a still picture form in the D-TV or HD digital TV connected via the digital interface, such as the IEEE 1394 interface.

What is claimed is:

1. A method of realizing still pictures from a high-density disc-type recording medium, comprising:

a first step of recording still information for identifying picture data, recorded in a specific location, as a still picture, along with the picture data; and

a second step of recording and managing information indicating whether a still picture exist in pieces of reproduction sequence information that correspond to HD stream Objects (HOBs) that include the picture data and are formed through logical division.

2. The method as set forth in claim 1, wherein the second step additionally records and manages information indicating a location of the still picture data in the reproduction sequence information.

3. The method as set forth in claim 1, wherein the second step is the step of recording the still information, along with the information indicating whether a still picture exist, in a header of a unit sector.

4. A method of realizing still pictures from a high-density disc-type recording medium, comprising:

a first step of detecting whether picture data read from the high-density disc-type recording medium is data corresponding to a still picture; and

a second step of, after transmission of the detected picture data, repeatedly transmitting a predicted picture thereof for a predetermined time period.

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FIG. 1

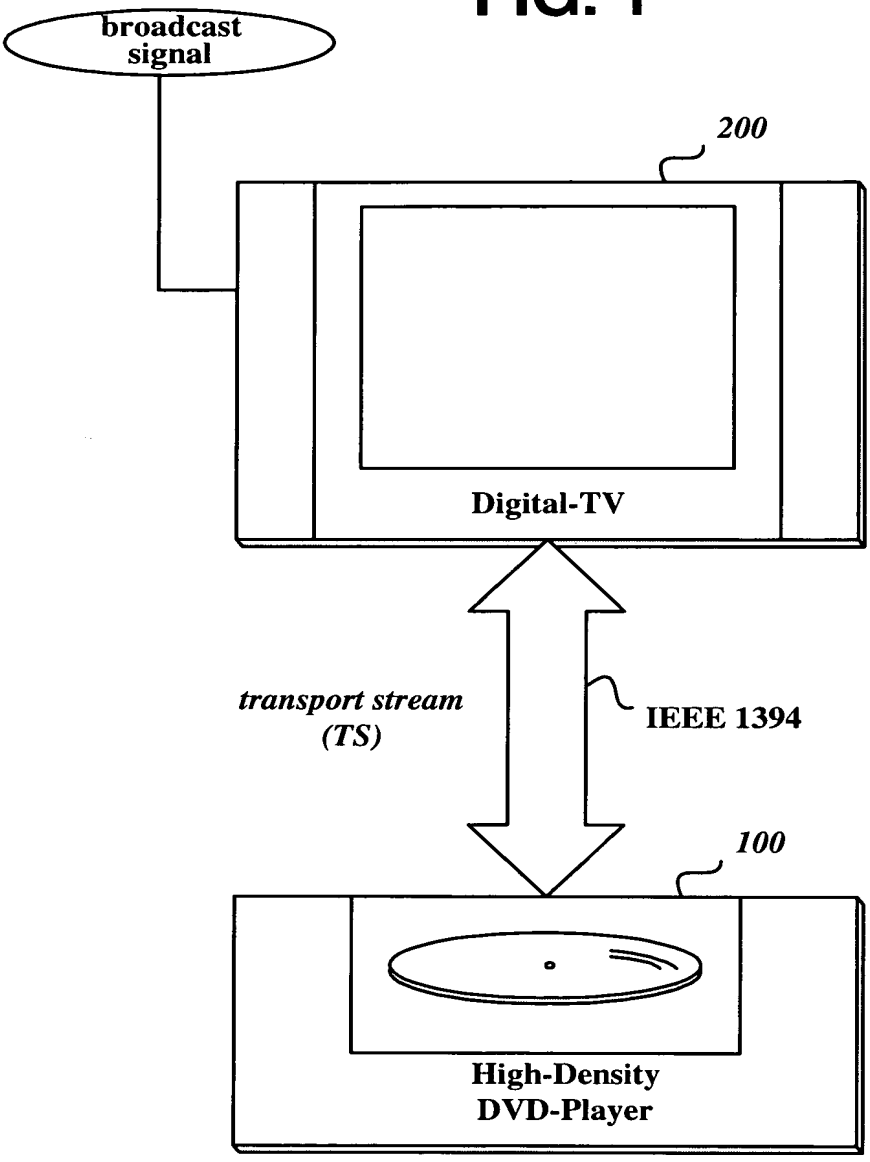


FIG. 2

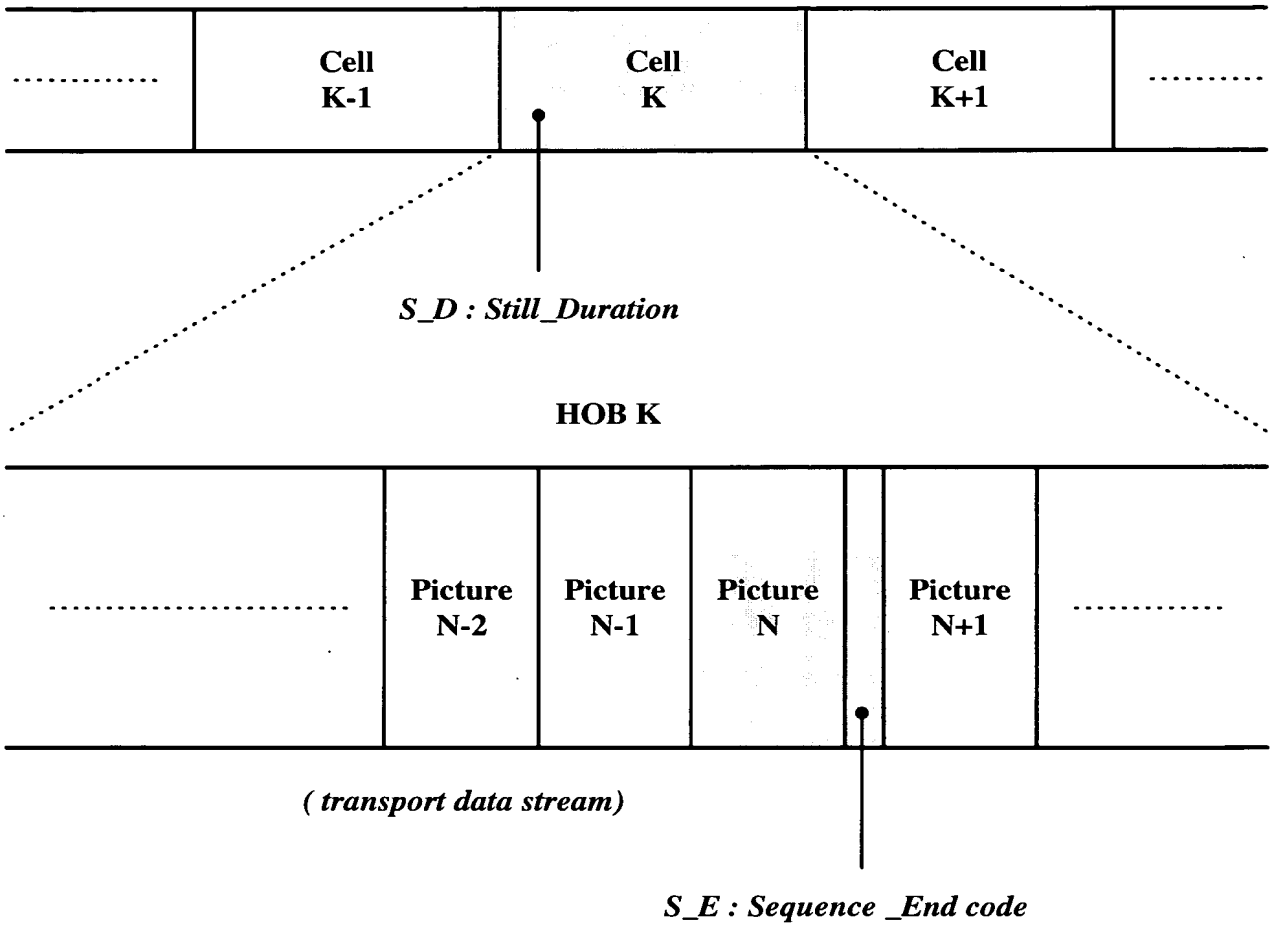

Cell
K-1
Cell
K
Cell
K+1
S_D : Still_Duration
HOB K
Picture
N-2
Picture
N-1
Picture
N
Picture
N+1
(transport data stream)
S_E : Sequence _End code

FIG. 3

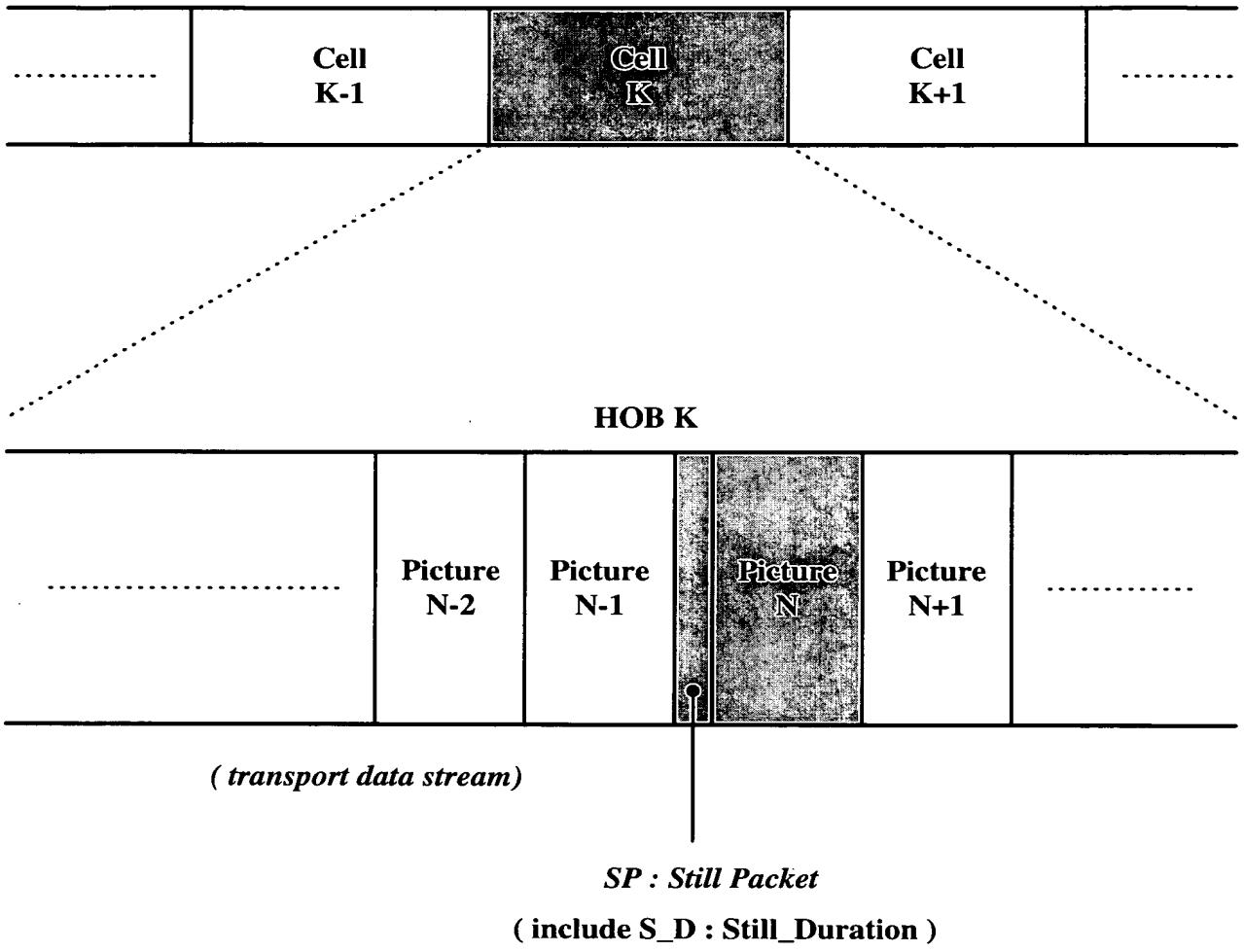

Cell K-1
Cell K
Cell K+1
HOB K
Picture N-2
Picture N-1
Picture N
Picture N+1
(transport data stream)
SP : Still Packet
(include S_D : Still_Duration)

FIG. 4

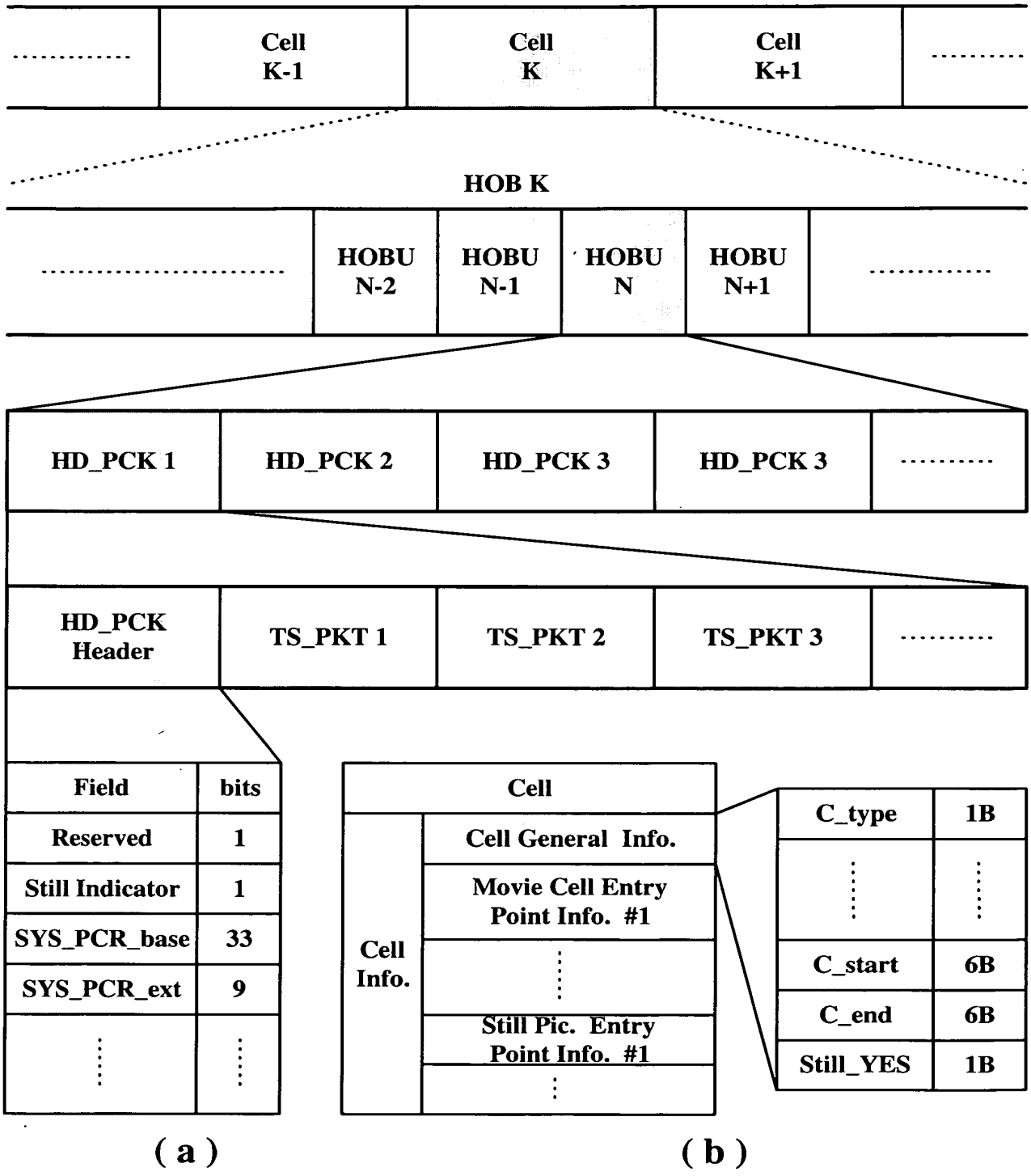
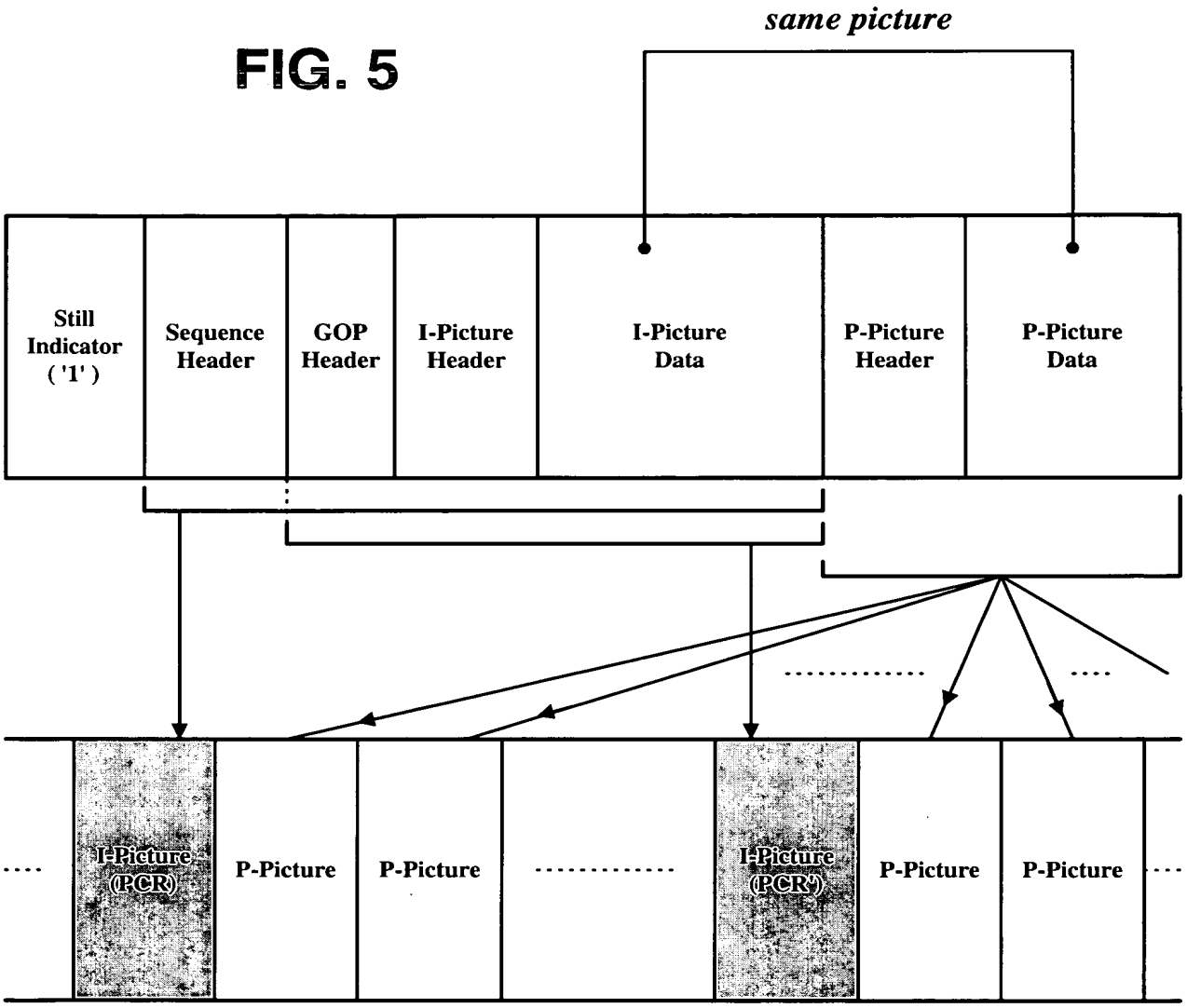

Cell K-1
Cell K
Cell K+1
HOB K
HOBU N-2
HOBU N-1
HOBU N
HOBU N+1
HD_PCK 1
HD_PCK 2
HD_PCK 3
HD_PCK 3
HD_PCK Header
TS_PKT 1
TS_PKT 2
TS_PKT 3
Field
bits
Reserved
1
Still Indicator
1
SYS_PCR_base
33
SYS_PCR_ext
9
Cell
Cell Info.
Cell General Info.
Movie Cell Entry Point Info. #1
Still Pic. Entry Point Info. #1
C_type
1B
C_start
6B
C_end
6B
Still_YES
1B
(a)
(b)

FIG. 5


same picture
Still Indicator ('1')
Sequence Header
GOP Header
I-Picture Header
I-Picture Data
P-Picture Header
P-Picture Data
I-Picture (PCR)
P-Picture
P-Picture
I-Picture (PCR')
P-Picture
P-Picture